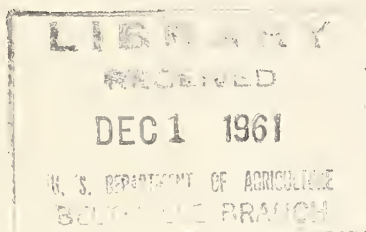


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Soil Moisture Characteristics

of Some Southern Piedmont Soils

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Growth Through Agricultural Progress

SOIL MOISTURE CHARACTERISTICS OF SOME SOUTHERN PIEDMONT SOILS¹

Charles B. Elkins, Jr., G. G. Williams, and Frank T. Ritchie, Jr.²

INTRODUCTION

Certain physical properties and moisture characteristics of selected Piedmont soils in Georgia are reported in this publication. These include the texture, bulk-density, percent moisture by volume at specified tensions, and available water-holding capacity by 6-inch increments of depth to 6 feet in the soil profile. Profile descriptions are also included for 14 sites.

To properly plan for efficient use of water, it is necessary to know how much available water a soil holds and to plan cropping sequences to best fit the characteristics of each individual soil. A better and more efficient fertility program can be planned when moisture characteristics of the soil are considered. For example, more efficient use of soil moisture is possible by adjustment of the plant population to fit the water-supplying ability of the soil.

The most direct application of the soil-moisture information presented here is in the planning and managing of irrigation farming. If the water-holding capacity of a soil to be irrigated is known, a much more accurate estimate can be made of the water supply needed and the pumping requirements to irrigate that soil. Knowledge of the water-holding capacity of the soil also makes it possible to better plan an irrigation schedule to fit an available water supply and to apply the right amount of water to wet the soil to the desired depth. Consideration of the moisture characteristics of a soil to be irrigated greatly increases the chance of planning a successful operation.

Soil-moisture information is also necessary in the planning of good soil drainage systems. Hydrologists should also find information such as reported here useful in studies of ground-water recharge and other related phenomena involving soil moisture characteristics.

A comparison of the available water-holding capacity of the soils included in this report to the available water-holding capacity of soils in other sections of the country will show that the soils of the Southern Piedmont store considerably less water for plant use. For example, compare a profile of Cecil soil, the most common soil series of the Piedmont, with a profile of Clinton soil, an important soil series in the Corn Belt. The Cecil soil (site 2a in this report) contains 7.8 inches of available water in the surface 4 feet of the soil profile whereas the Clinton soil³ holds 12.5 inches of available water in the upper 4 feet. During periods of inadequate rainfall, this extra 4.7 inches of water

¹ Joint contribution of the Soil and Water Conservation Research Division, Agricultural Research Service, and Soil Conservation Service, United States Department of Agriculture, in cooperation with the Agronomy Department, Georgia Agricultural Experiment Station.

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³ Peters, D. B., and Bartelli, L. J. Soil moisture survey of some representative Illinois soil types. U. S. Agr. Res. Serv. ARS 41-21, 40 pp., June 1958.

Acknowledgment and grateful appreciation is extended to C. L. McIntyre, Dan H. Jordan, Louie Frost, and Stanley Robertson, soil scientists, USDA Soil Conservation Service, for their assistance in locating soil sites and writing soil profile descriptions. Acknowledgment is also given to Jack Thomas and Richard Montgomery, agricultural aides, USDA Agricultural Research Service, for collecting the soil samples and making the many laboratory determinations.

could mean a great deal in terms of crop production. The above comparison is made to show the need for consideration of soil-moisture information in planning crops on Piedmont soils in the Southeast. Every effort should be made to make efficient use of the water stored in the soil.

SOILS STUDIED

Twenty-two sites of 11 soil series were included in the study. The 11 soil series consisted of 9 upland soils, a bottomland soil, and a terrace soil. The soils were selected on the basis of their agricultural importance. The upland soils were Appling, Cecil, Davidson, Durham, Georgeville, Helena, Iredell, Lloyd, and Madison; the bottomland soil, Congaree; and the terrace, Wickham. The map in Figure 1 shows the geographical locations of these soils. Samples were taken in 6-inch increments throughout the soil profile. This thorough sampling was done in order to evaluate the variability of the soil within horizons at fixed sites.

SAMPLING PROCEDURE

Samples for textural analysis and moisture desorption determinations were taken with a bucket-type auger that was 3 inches in diameter. Each site was sampled in 6-inch increments to a depth of 6 feet, or only through the C horizon if the soil was less than 6 feet in depth. Four subsamples were taken from each site. All samples were air-dried and sieved through a 10-mesh sieve prior to textural analysis and moisture desorption determinations.

Four subsamples were also taken from each site for bulk-density determinations. These samples were 3 by 3-inch cores taken with a Uhland soil sampler. Samples were taken from the center of 6-inch increments to a depth of 2 feet and from the center of 12-inch increments from 2 to 4 feet.

LABORATORY PROCEDURE AND CALCULATIONS

The pressure-membrane apparatus⁴ was used to determine the 15, 8, 4, and 2 atmosphere points on the moisture-desorption curve, and a pressure-plate apparatus⁵ was used to determine the 1/3-atmosphere value. These determinations gave the percent of water by weight remaining in the soil sample after reaching equilibrium at a given tension. This was converted to percent by volume by multiplying the percent by weight value of water retained in the soil by the bulk-density of the soil. Then, multiplication by the increment of soil in inches gave inches of water in a given layer of soil. Available water was calculated by subtracting the 15-atmosphere value from the 1/3-atmosphere value.

It is recognized that moisture-holding capacity at any tension and hence available water as calculated would be different in absolute value for undisturbed cores of the soil material. The procedures used in this study have been widely employed however and offer a means of comparing soils.

In making the textural analysis, percent clay was determined by the hydrometer method, percent sand by wet sieving through a 300-mesh sieve, and percent silt by difference.

Cores for bulk-density determinations were carried into the laboratory, trimmed, dried in a draft oven at 105° C. for 48 hours, and weighed. Bulk-density was calculated by dividing the weight of the oven-dry soil in grams by the volume of the core in cubic centimeters.

⁴ Richards, L. A. A pressure-membrane extraction apparatus for soil solution. Soil Sci. 51:377-386, 1941.

⁵ Richards, L. A. Methods of measuring soil moisture tension. Soil Sci. 68:95-112, 1943.

RESULTS AND DISCUSSION

Table 1 gives the inches of available water held in the top 4 feet of the soil profile for each site studied. A sufficient number of sites were not studied for each soil to determine the variation from site to site within a soil series. However, the values obtained for those soils for which more than one site was studied indicate that some soils such as Davidson and Wickham may be fairly uniform in available water-holding capacity. On the other hand, soils such as Appling, Cecil, and Lloyd have very large variations in available water-holding capacity. It is hoped that further study of at least the more important soils included in this report will better define the variations that exist within a given soil series.

The physical and moisture data collected for the individual sites are reported in 22 tables. Soil profile descriptions of 14 of the sites studied are appended at the end of the report.

Legend

- 1a, b Appling
- 2a, b, c Cecil
- 3a Congaree
- 4a, b, c Davidson
- 5a Durham
- 6a Georgeville
- 7a Helena
- 8a Iredell
- 9a, b, c, d Lloyd
- 10a Madison
- 11a, b, c, d Wickham

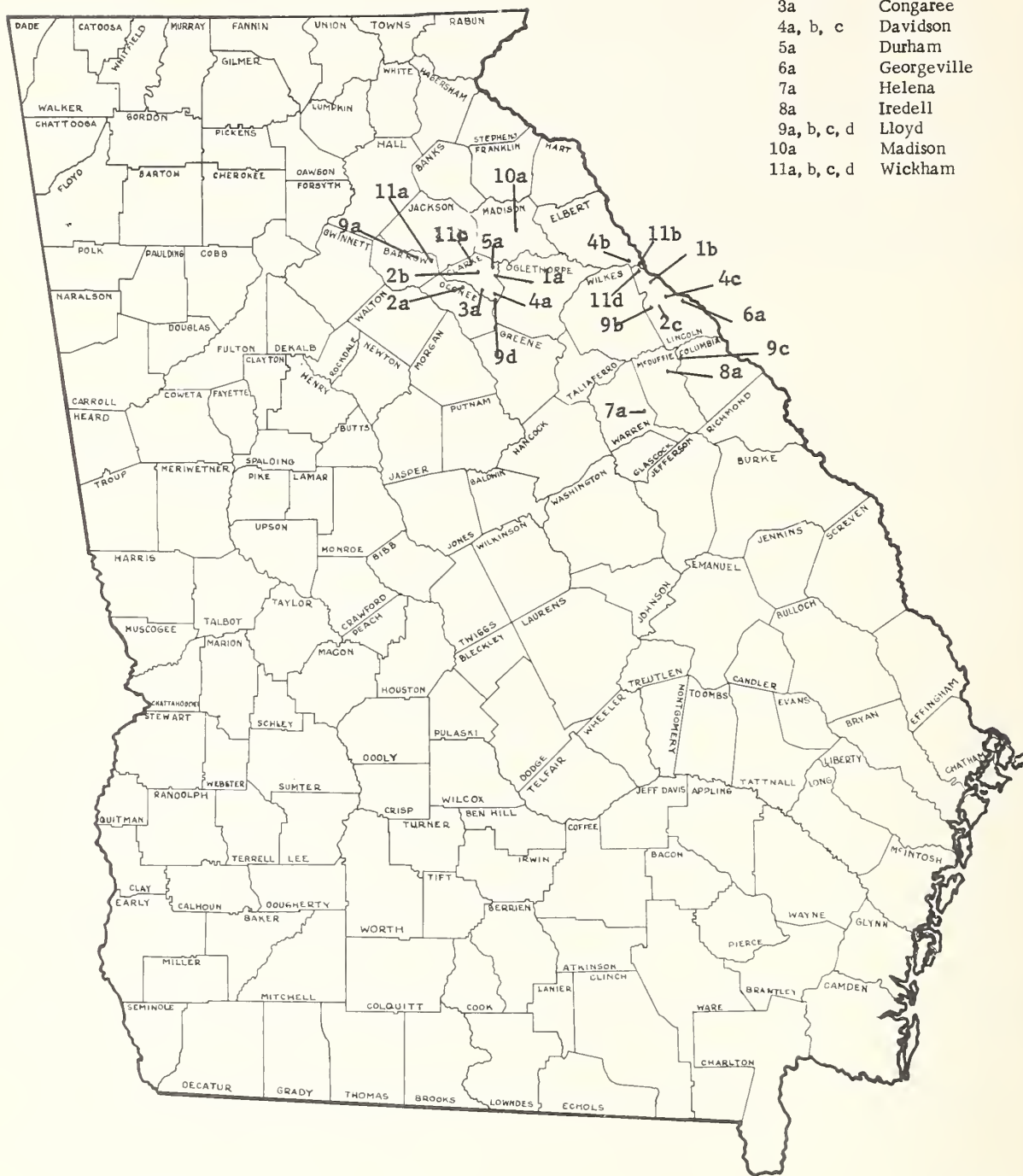


Figure 1. --Location of Piedmont soils studied in Georgia.

TABLE 1.--Inches of available water in the surface 4 feet of
the soil profile

Soil No.	Soil Series	Site (a)	Site (b)	Site (c)	Site (d)
1.....	Appling	5.65	9.49		
2.....	Cecil	7.80	4.40	7.37	
3.....	Congaree	3.67			
4.....	Davidson	5.06	5.08	5.67	
5.....	Durham	4.15			
6.....	Georgeville	8.05			
7.....	Helena	4.32			
8.....	Iredell	10.43			
9.....	Lloyd	7.35	6.58	8.26	3.79
10.....	Madison	8.72			
11.....	Wickham	3.74	4.05	4.44	4.45

Individual soils may be located on the map of Figure 1, and in other tables by use of the soil number and site designation. Available water is used here as the amount held in the soil between tensions of 1/3 and 15 atmospheres. Determination was made on samples of disturbed soil material.

PHYSICAL AND MOISTURE CHARACTERISTICS

Sample 1a

Soil Type: Appling sandy loam
 Classification: Red-yellow podzolic
 Area: Clark County, Georgia

Parent Material: Granite and granite gneiss
 Drainage: Well

Depth (in.)	Bulk density	Percent water by volume					Available water	Textural analysis		
		1/3 atm	2 atm	4 atm	8 atm	15 atm		Sand	Silt	Clay
							<u>In.</u>	<u>Pct.</u>	<u>Pct.</u>	<u>Pct.</u>
0-6	1.47	17.15	14.54	12.74	9.16	8.98	0.49	65	17	18
6-12	1.65	32.13	26.60	24.40	21.85	17.34	.89	44	19	37
12-18	1.56	38.44	33.09	30.01	27.52	26.66	.71	35	19	46
18-24	1.54	41.80	36.22	33.59	32.97	31.91	.59	31	20	49
24-30	1.55	42.76	37.28	35.00	32.27	31.98	.65	30	22	48
30-36		43.35	38.25	35.19	32.97	33.11	.61	31	22	47
36-42	1.55	45.14	38.47	35.05	32.32	31.84	.80	37	20	43
42-48		40.28	33.87	29.93	26.97	25.13	.91	39	26	35
48-54	--	41.94	37.28	29.59	26.83	26.12	.95	42	26	32
54-60	--	40.13	34.08	27.03	23.70	22.30	1.07	45	27	28
60-66	--	38.33	31.33	25.62	22.72	20.06	1.10	46	27	27
66-72	--	37.03	32.01	25.22	21.37	18.31	<u>1.12</u>	43	31	26
Total.....							9.89			

Sample 1b

Soil Type: Appling sandy clay loam
 Classification: Red-yellow podzolic
 Area: Lincoln County, Georgia

Parent Material: Granite and granite gneiss
 Drainage: Well

Depth (in.)	Bulk density	Percent water by volume					Available water	Textural analysis		
		1/3 atm	2 atm	4 atm	8 atm	15 atm		Sand	Silt	Clay
							<u>In.</u>	<u>Pct.</u>	<u>Pct.</u>	<u>Pct.</u>
0-6	1.72	25.59	19.38	16.84	14.31	12.78	0.77	61	17	22
6-12	1.53	39.63	31.73	33.89	25.38	23.01	1.00	34	26	40
12-18	1.51	40.02	32.09	28.27	25.17	22.62	1.04	33	28	39
18-24	1.66	44.49	34.38	30.89	27.27	25.02	1.17	34	29	36
24-30	1.68	46.52	35.30	31.89	28.69	25.42	1.27	34	30	36
30-36		47.24	35.52	31.52	26.93	24.95	1.34	34	33	33
36-42	1.65	45.66	33.53	29.06	25.91	23.53	1.33	36	31	33
42-48		47.11	32.85	28.43	23.71	20.94	1.57	35	35	30
48-54	--	45.08	32.18	27.42	23.22	20.43	1.48	39	31	30
54-60	--	42.78	30.90	25.77	21.57	18.98	1.43	41	32	27
60-66	--	43.49	33.41	25.92	20.99	18.02	1.53	38	36	26
66-72	--	40.56	32.44	24.73	21.63	18.61	<u>1.32</u>	41	32	27
Total.....							15.25			

Sample 2a

Soil Type: Cecil sandy loam
 Classification: Red-yellow podzolic
 Area: Oconee County, Georgia

Parent Material: Granite and granite gneiss
 Drainage: Well

Depth (in.)	Bulk density	Percent water by volume					Available water	Textural analysis		
		1/3 atm	2 atm	4 atm	8 atm	15 atm		Sand	Silt	Clay
							<u>In.</u>	<u>Pct.</u>	<u>Pct.</u>	<u>Pct.</u>
0-6	1.72	19.61	13.16	10.90	9.32	7.28	0.74	72	14	14
6-12	1.52	28.42	19.12	17.51	17.24	15.28	.79	56	15	29
12-18	1.58	39.12	27.97	27.49	25.88	23.91	.91	45	16	39
18-24	1.58	44.37	33.88	31.81	30.30	27.59	1.01	39	18	43
24-30	1.52	47.73	35.99	33.91	32.54	30.05	1.06	32	20	48
30-36		45.74	34.22	31.39	30.55	28.36	1.04	34	21	45
36-42	1.60	44.98	33.54	30.38	28.93	26.16	1.13	38	23	39
42-48		41.20	30.50	27.20	26.51	22.54	1.12	42	23	35
48-54	--	40.85	29.31	26.38	24.18	22.03	1.13	44	22	34
54-60	--	42.14	29.70	26.94	25.20	21.92	1.21	43	23	34
60-66	--	40.86	31.34	27.41	25.09	21.90	1.14	42	25	33
66-72	--	44.05	29.30	25.58	22.91	19.79	<u>1.46</u>	45	25	30
Total.....							12.74			

Sample 2b

Soil Type: Cecil sandy clay loam
 Classification: Red-yellow podzolic
 Area: Clarke County, Georgia

Parent Material: Granite and granite gneiss
 Drainage: Well

Depth (in.)	Bulk density	Percent water by volume					Available water	Textural analysis		
		1/3 atm	2 atm	4 atm	8 atm	15 atm		Sand	Silt	Clay
							<u>In.</u>	<u>Pct.</u>	<u>Pct.</u>	<u>Pct.</u>
0-6	1.43	19.41	16.20	14.10	12.66	11.64	0.47	58	15	27
6-12	1.52	22.33	18.86	17.10	16.43	15.00	.44	51	14	35
12-18	1.54	26.41	23.24	22.04	20.54	19.53	.41	47	12	41
18-24	1.61	31.73	29.00	27.43	25.53	24.02	.46	47	10	43
24-30	1.66	33.66	29.81	28.19	26.91	25.28	.50	48	10	42
30-36		33.57	30.05	27.69	25.95	24.10	.57	49	11	40
36-42	1.56	36.13	32.18	29.67	27.96	26.41	.58	42	13	45
42-48		41.22	33.96	29.69	27.52	24.99	.97	41	18	41
48-54	--	45.12	36.43	33.17	30.61	27.64	1.05	40	18	42
54-60	--	43.34	36.02	32.64	29.22	27.08	.98	40	19	41
60-66	--	44.97	34.60	30.53	27.58	23.85	<u>1.27</u>	45	20	35
Total.....							7.70			

Sample 2c

Soil Type: Cecil sandy loam
 Classification: Red-yellow podzolic
 Area: Lincoln County, Georgia

Parent Material: Granite and granite gneiss
 Drainage: Well

Depth (in.)	Bulk density	Percent water by volume					Available water	Textural analysis		
		1/3 atm	2 atm	4 atm	8 atm	15 atm		Sand	Silt	Clay
							<u>In.</u>	<u>Pct.</u>	<u>Pct.</u>	<u>Pct.</u>
0-6	1.75	20.44	13.05	11.88	9.87	7.74	0.76	70	14	16
6-12	1.64	20.29	13.55	11.78	9.66	7.51	.77	68	14	18
12-18	1.59	30.29	23.01	20.53	18.25	16.17	.85	48	19	33
18-24	1.64	39.36	30.65	27.99	25.62	22.89	.99	40	24	36
24-30	1.66	42.78	33.60	30.63	28.54	26.58	.97	41	15	44
30-36		43.36	34.46	32.14	30.11	28.05	.92	42	16	42
36-42	1.68	41.90	32.78	30.00	27.25	24.60	1.04	51	15	34
42-48		37.09	27.13	24.31	22.68	19.19	1.07	60	15	25
48-54	--	35.52	25.74	22.61	19.72	17.25	1.10	63	15	22
54-60	--	34.89	25.89	22.14	19.56	17.02	1.07	64	17	19
60-66	--	32.32	24.01	19.72	16.60	14.28	1.08	67	14	19
66-72	--	30.53	22.44	18.06	15.39	12.89	1.06	69	13	18
Total.....							11.68			

Sample 3a

Soil Type: Congaree sandy loam
 Classification: Alluvial
 Area: Clarke County, Georgia

Parent Material: Mixed alluvium
 Drainage: Good

Depth (in.)	Bulk density	Percent water by volume					Available water	Textural analysis		
		1/3 atm	2 atm	4 atm	8 atm	15 atm		Sand	Silt	Clay
							<u>In.</u>	<u>Pct.</u>	<u>Pct.</u>	<u>Pct.</u>
0-6	1.49	25.94	19.33	15.11	13.63	11.38	0.87	54	30	16
6-12	1.49	17.63	13.14	10.79	9.42	7.57	.60	65	22	13
12-18	1.44	9.76	7.06	5.96	4.77	3.86	.35	77	14	9
18-24	1.39	8.91	5.99	5.77	4.20	3.14	.35	76	15	9
24-30	1.44	9.85	6.88	5.64	4.85	3.80	.36	74	16	10
30-36		10.50	7.46	5.96	4.67	4.52	.36	74	16	10
36-42	1.49	11.31	8.22	7.18	5.99	4.83	.39	74	16	10
42-48		10.62	7.63	6.60	5.23	4.17	.39	75	15	10
48-54	--	10.00	6.17	5.29	4.57	3.58	.38	78	12	10
54-60	--	10.97	7.52	6.20	5.57	4.02	.42	77	13	10
60-66	--	11.65	8.51	6.69	6.32	4.87	.41	78	11	11
66-72	--	12.32	9.09	8.00	6.96	6.66	.34	76	11	13
Total.....							5.22			

Sample 4a

Soil Type: Davidson clay
 Classification: Reddish brown latosol
 Area: Clarke County, Georgia

Parent Material: Basic rock
 Drainage: Well

Depth (in.)	Bulk density	Percent water by volume					Available water	Textural analysis		
		1/3 atm	2 atm	4 atm	8 atm	15 atm		Sand	Silt	Clay
							<u>In.</u>	<u>Pct.</u>	<u>Pct.</u>	<u>Pct.</u>
0-6	1.35	25.30	21.74	20.02	19.26	18.99	0.38	39	18	43
6-12	1.37	30.09	26.45	24.78	23.99	23.67	.39	34	15	51
12-18	1.47	34.81	30.19	28.39	27.00	26.97	.47	33	13	54
18-24	1.52	36.48	31.62	30.07	28.97	28.24	.49	34	14	52
24-30	1.61	40.44	33.29	31.67	29.27	28.85	.70	34	15	51
30-36		42.63	34.68	31.48	29.67	28.42	.85	35	17	48
36-42	1.67	43.84	36.32	33.00	30.59	29.11	.88	36	18	46
42-48		43.42	35.82	31.55	29.23	28.37	.90	37	21	42
48-54	--	43.57	35.35	31.55	27.37	26.45	1.03	40	21	39
54-60	--	42.92	33.65	28.89	25.23	24.55	1.10	43	22	35
60-66	--	44.56	34.17	28.89	24.42	24.13	1.23	44	24	32
66-72	--	45.06	33.92	27.99	23.61	22.95	<u>1.33</u>	42	28	30
Total.....							9.75			

Sample 4b

Soil Type: Davidson clay
 Classification: Reddish brown latosol
 Area: Elbert County, Georgia

Parent Material: Basic rock
 Drainage: Well

Depth (in.)	Bulk density	Percent water by volume					Available water	Textural analysis		
		1/3 atm	2 atm	4 atm	8 atm	15 atm		Sand	Silt	Clay
							<u>In.</u>	<u>Pct.</u>	<u>Pct.</u>	<u>Pct.</u>
0-6	1.73	40.59	35.29	32.59	30.21	29.72	0.65	13	28	59
6-12	1.57	44.04	37.48	36.35	33.43	32.09	.72	11	23	66
12-18	1.56	43.01	37.63	35.63	33.45	32.04	.66	10	21	69
18-24	1.60	43.23	38.74	35.94	34.32	33.26	.60	11	20	69
24-30	1.65	44.12	39.01	36.76	34.62	34.02	.57	12	20	68
30-36		44.70	39.39	36.94	35.43	34.80	.59	11	21	68
36-42	1.58	44.87	39.18	36.89	35.33	34.55	.62	10	19	71
42-48		45.85	40.02	37.08	35.42	34.76	.67	10	19	71
48-54	--	48.84	41.78	40.08	37.73	36.31	.75	8	20	72
54-60	--	51.51	44.29	41.49	39.86	39.44	.72	7	20	73
60-66	--	55.52	45.01	41.98	40.42	37.27	1.10	8	20	72
66-72	--	53.48	45.47	43.13	41.48	39.75	<u>.82</u>	7	22	71
Total.....							8.47			

Sample 4c

Soil Type: Davidson clay loam
 Classification: Reddish brown latosol
 Area: Lincoln County, Georgia

Parent Material: Basic rock
 Drainage: Well

Depth (in.)	Bulk density	Percent water by volume					Available water	Textural analysis		
		1/3 atm	2 atm	4 atm	8 atm	15 atm		Sand	Silt	Clay
							<u>In.</u>	<u>Pct.</u>	<u>Pct.</u>	<u>Pct.</u>
0-6	1.52	31.11	24.20	21.71	19.26	17.53	0.81	45	23	32
6-12	1.61	30.80	26.82	23.26	21.83	19.80	.66	42	17	41
12-18	1.70	37.21	31.72	29.68	27.78	26.44	.65	34	16	50
18-24	1.64	40.20	34.65	32.36	31.19	28.95	.68	29	13	58
24-30	1.58	40.86	35.76	32.82	31.82	30.04	.65	27	13	60
30-36		40.27	36.13	33.69	32.01	30.49	.59	28	14	58
36-42	1.66	45.42	38.30	35.56	33.66	31.32	.85	24	19	57
42-48		42.94	36.19	33.65	31.49	30.00	.78	29	18	53
48-54	--	43.81	36.44	33.47	31.32	29.66	.85	29	20	51
54-60	--	46.10	37.17	33.78	31.72	28.80	1.04	27	23	50
60-66	--	48.09	37.70	33.70	30.98	27.64	1.23	26	26	48
66-72	--	49.39	38.06	33.76	30.08	26.69	<u>1.36</u>	26	27	47
Total.....							10.15			

Sample 5a

Soil Type: Durham sandy loam
 Classification: Red-yellow podzolic
 Area: Clarke County, Georgia

Parent Material: Granite and granite gneiss
 Drainage: Well

Depth (in.)	Bulk density	Percent water by volume					Available water	Textural analysis		
		1/3 atm	2 atm	4 atm	8 atm	15 atm		Sand	Silt	Clay
							<u>In.</u>	<u>Pct.</u>	<u>Pct.</u>	<u>Pct.</u>
0-6	1.64	19.32	13.83	10.82	9.18	7.64	0.70	64	22	14
6-12	1.60	18.18	13.44	11.81	11.60	11.47	.40	54	29	17
12-18	1.61	24.68	18.45	17.61	16.57	16.49	.49	55	20	25
18-24	1.61	30.46	24.50	23.81	23.07	22.07	.50	47	19	34
24-30	1.49	32.45	25.45	25.29	25.00	23.54	.53	42	18	40
30-36		33.27	27.77	26.85	25.78	24.57	.52	40	17	43
36-42	1.55	31.48	26.89	26.04	24.86	21.59	.59	42	19	39
42-48		25.82	20.91	20.71	19.87	18.85	.42	50	16	34
48-54	--	22.23	19.17	16.03	14.46	13.38	.53	60	15	25
54-60	--	24.06	19.05	17.07	16.24	12.51	<u>.69</u>	61	15	24
Total.....							5.37			

Sample 6a

Soil Type: Georgeville clay
 Classification: Red-yellow podzolic
 Area: Lincoln County, Georgia

Parent Material: Carolina slate
 Drainage: Moderately well

Depth (in.)	Bulk density	Percent water by volume					Available water	Textural analysis		
		1/3 atm	2 atm	4 atm	8 atm	15 atm		Sand	Silt	Clay
							<u>In.</u>	<u>Pct.</u>	<u>Pct.</u>	<u>Pct.</u>
0-6	1.35	34.94	27.30	26.27	23.42	22.67	0.74	29	26	45
6-12	1.32	46.78	39.86	37.61	35.28	34.27	.75	8	24	68
12-18	1.43	50.21	42.26	38.88	35.94	34.93	.92	8	30	62
18-24	1.51	49.86	40.38	38.70	36.00	34.61	.92	15	25	60
24-30	1.54	51.08	40.89	37.14	34.06	33.14	1.02	12	36	52
30-36		56.43	43.86	42.49	39.93	38.95	1.05	7	30	63
36-42	1.60	52.02	46.06	34.90	31.10	30.66	1.28	19	38	43
42-48		49.30	37.60	31.25	27.76	26.42	1.37	23	42	35
48-54	--	50.16	43.94	31.52	29.14	27.04	1.39	20	32	48
54-60	--	50.32	38.08	33.31	29.58	28.99	<u>1.28</u>	17	40	43
Total.....							10.72			

Sample 7a

Soil Type: Helena loamy sand
 Classification: Planosol
 Area: Warren County, Georgia

Parent Material: Granite, quartz diorite,
 and schist intrusions
 Drainage: Imperfect

Depth (in.)	Bulk density	Percent water by volume					Available water	Textural analysis		
		1/3 atm	2 atm	4 atm	8 atm	15 atm		Sand	Silt	Clay
							<u>In.</u>	<u>Pct.</u>	<u>Pct.</u>	<u>Pct.</u>
0-6	1.73	7.91	6.12	4.52	3.37	2.98	0.30	82	10	8
6-12	1.70	16.17	12.67	10.76	9.10	7.55	.52	72	12	16
12-18	1.63	24.30	21.34	19.12	16.74	15.70	.52	63	10	27
18-24	1.54	28.98	26.61	24.18	22.48	20.61	.50	54	11	35
24-30	1.45	34.68	30.80	29.38	27.09	26.07	.52	42	10	48
30-36		41.98	39.60	35.09	32.52	31.28	.64	29	11	60
36-42	1.43	40.88	38.47	33.75	31.55	30.63	.62	28	13	59
42-48		42.10	36.98	33.69	33.68	30.46	.70	31	17	52
48-54	--	44.77	35.24	34.56	31.55	30.64	.85	32	20	48
54-60	--	48.51	39.12	35.62	33.43	31.75	1.01	33	25	42
60-66	--	50.91	41.58	37.69	34.16	32.40	1.11	27	30	43
66-72	--	47.05	37.35	33.89	30.93	28.99	<u>1.08</u>	36	28	36
Total.....							8.37			

Sample 8a

Soil Type: Iredell sandy clay loam
 Classification: Planosol
 Area: McDuffie County, Georgia

Parent Material: Basic rock
 Drainage: Imperfect

Depth (in.)	Bulk density	Percent water by volume					Available water	Textural analysis		
		1/3 atm	2 atm	4 atm	8 atm	15 atm		Sand	Silt	Clay
							<u>In.</u>	<u>Pct.</u>	<u>Pct.</u>	<u>Pct.</u>
0-6	1.46	23.35	19.68	16.69	14.29	13.49	0.59	61	16	23
6-12	1.42	51.23	45.99	38.82	33.99	31.30	1.20	26	13	61
12-18	1.50	50.52	44.03	36.71	31.85	29.25	1.28	29	16	51
18-24	1.56	49.61	42.49	35.72	31.75	28.78	1.25	34	17	49
24-30	1.63	51.64	44.24	36.94	31.87	29.14	1.35	37	17	46
30-36		54.75	45.92	38.60	33.61	30.30	1.47	37	16	47
36-42	1.70	58.24	48.81	38.30	34.39	31.14	1.63	41	17	42
42-48		57.92	43.91	35.94	31.01	30.24	1.66	51	15	34
48-54	--	45.83	35.85	29.36	21.39	20.15	<u>1.54</u>	57	14	29
Total.....							11.97			

Sample 9a

Soil Type: Lloyd sandy loam
 Classification: Red-yellow podzolic
 Area: Barrow County, Georgia

Parent Material: Acid and basic rocks
 Drainage: Well

Depth (in.)	Bulk density	Percent water by volume					Available water	Textural analysis		
		1/3 atm	2 atm	4 atm	8 atm	15 atm		Sand	Silt	Clay
							<u>In.</u>	<u>Pct.</u>	<u>Pct.</u>	<u>Pct.</u>
0-6	1.37	22.62	15.48	11.22	8.97	7.30	0.92	65	17	18
6-12	1.55	24.40	17.62	15.14	13.69	9.28	.91	53	18	29
12-18	1.52	30.19	24.94	22.40	20.17	16.86	.80	45	20	35
18-24	1.51	41.93	34.32	31.24	30.08	27.56	.86	30	16	54
24-30	1.49	46.94	38.56	36.45	33.21	31.11	.95	25	19	56
30-36		47.69	39.54	36.62	34.27	31.86	.95	31	21	48
36-42	1.50	40.79	31.71	28.76	26.78	24.86	.96	39	18	43
42-48		39.98	31.83	28.22	27.30	23.39	1.00	40	17	43
48-54	--	40.59	29.97	26.06	23.15	20.51	1.20	41	22	37
54-60	--	38.64	30.32	24.21	22.25	17.66	<u>1.26</u>	43	21	36
Total.....							9.81			

Sample 9b

Soil Type: Lloyd sandy clay loam
 Classification: Red-yellow podzolic
 Area: Lincoln County, Georgia

Parent Material: Acid and basic rocks
 Drainage: Well

Depth (in.)	Bulk density	Percent water by volume					Available water	Textural analysis		
		1/3 atm	2 atm	4 atm	8 atm	15 atm		Sand	Silt	Clay
							In.	Pct.	Pct.	Pct.
0-6	1.76	22.04	18.22	16.60	15.22	13.22	0.53	55	17	28
6-12	1.61	37.55	33.89	29.58	29.33	25.71	.71	29	14	57
12-18	1.54	39.19	35.08	32.28	31.02	26.50	.76	25	13	62
18-24	1.60	39.18	33.34	30.99	29.44	24.48	.88	27	17	56
24-30	1.61	40.49	33.07	30.11	28.14	25.60	.89	27	19	54
30-36		43.10	34.49	30.78	29.30	27.63	.93	25	22	53
36-42	1.65	45.16	36.45	32.36	31.66	29.73	.93	22	27	51
42-48		47.92	38.79	36.02	33.68	32.13	.95	21	28	51
48-54	--	50.24	41.76	37.52	36.10	33.21	1.02	21	25	54
54-60	--	52.29	42.44	37.77	35.76	33.54	1.13	21	27	52
60-66	--	52.22	42.41	38.16	35.00	32.70	1.17	24	27	49
66-72	--	51.78	42.65	37.74	35.08	32.44	<u>1.16</u>	24	27	49
Total.....							11.06			

Sample 9c

Soil Type: Lloyd sandy loam
 Classification: Red-yellow podzolic
 Area: Columbia County, Georgia

Parent Material: Acid and basic rocks
 Drainage: Well

Depth (in.)	Bulk density	Percent water by volume					Available water	Textural analysis		
		1/3 atm	2 atm	4 atm	8 atm	15 atm		Sand	Silt	Clay
							In.	Pct.	Pct.	Pct.
0-6	1.76	19.17	14.89	12.80	11.16	9.77	0.56	72	9	19
6-12	1.73	56.66	49.81	44.65	41.45	38.61	1.08	25	14	61
12-18	1.52	54.10	47.04	42.80	39.93	37.64	.99	20	19	61
18-24	1.51	49.81	43.35	39.06	37.18	32.93	1.01	23	18	59
24-30	1.50	49.31	43.94	40.17	37.13	35.42	.83	22	18	60
30-36		46.52	39.41	34.68	30.95	28.85	1.06	33	19	48
36-42	1.54	49.68	39.45	34.42	31.29	27.97	1.30	38	19	43
42-48		45.43	34.03	29.54	26.36	21.65	1.43	45	19	36
48-54	--	46.25	33.33	28.69	25.50	22.24	1.44	47	20	33
54-60	--	51.96	38.67	32.76	29.23	25.56	1.58	43	21	36
60-66	--	56.61	42.26	36.93	33.05	29.24	1.64	31	27	42
66-72	--	59.09	43.83	37.71	34.08	30.66	<u>1.71</u>	32	26	42
Total.....							14.63			

Sample 9d

Soil Type: Lloyd clay loam
 Classification: Red-yellow podzolic
 Area: Clarke County, Georgia

Parent Material: Acid and basic rock
 Drainage: Well

Depth (in.)	Bulk density	Percent water by volume					Available water	Textural analysis		
		1/3 atm	2 atm	4 atm	8 atm	15 atm		Sand	Silt	Clay
							<u>In.</u>	<u>Pct.</u>	<u>Pct.</u>	<u>Pct.</u>
0-6	1.65	26.75	21.00	17.67	15.66	13.61	0.79	37	34	29
6-12	1.58	30.83	26.48	23.10	22.37	21.71	.55	28	28	44
12-18	1.46	34.00	29.42	27.21	25.83	24.91	.55	24	24	52
18-24	1.44	34.95	33.21	30.77	29.98	28.79	.37	27	12	61
24-30	1.48	36.14	34.23	31.24	31.11	29.54	.40	26	13	61
30-36		36.05	34.35	32.57	31.58	29.67	.38	27	13	60
36-42	--	35.49	32.83	31.14	30.13	28.65	.41	27	16	57
42-48	--	33.40	30.93	29.96	28.36	27.81	.34	30	19	51
48-54	--	38.17	33.80	31.32	30.86	27.66	.63	30	19	51
54-60	--	42.28	37.44	35.82	32.86	31.02	.68	26	20	54
60-66	--	45.15	39.84	37.06	35.52	32.89	.74	27	17	56
66-72	--	42.33	36.35	32.83	31.54	28.68	<u>.82</u>	31	18	51
Total.....							6.66			

Sample 10a

Soil Type: Madison sandy loam
 Classification: Red-yellow podzolic
 Area: Madison County, Georgia

Parent Material: Quartz and mica schist
 Drainage: Well

Depth (in.)	Bulk density	Percent water by volume					Available water	Textural analysis		
		1/3 atm	2 atm	4 atm	8 atm	15 atm		Sand	Silt	Clay
							<u>In.</u>	<u>Pct.</u>	<u>Pct.</u>	<u>Pct.</u>
0-6	1.46	32.16	26.29	16.98	12.41	10.34	1.31	62	20	18
6-12	1.49	31.48	24.90	20.86	17.40	13.62	1.07	52	17	31
12-18	1.35	44.27	37.57	33.47	31.50	27.36	1.01	26	19	55
18-24	1.33	45.58	40.57	37.05	35.11	33.81	.77	17	25	58
24-30	1.35	51.45	44.00	40.00	37.81	36.38	.90	14	30	56
30-36		50.84	42.77	38.96	36.29	34.32	.99	13	36	51
36-42	1.38	55.68	46.49	40.34	37.04	34.00	1.30	10	40	50
42-48		54.37	45.40	37.83	34.76	31.55	1.37	10	38	52
48-54	--	57.75	49.24	39.48	35.65	33.23	1.47	9	37	54
54-60	--	55.60	45.62	35.65	31.30	28.26	1.62	11	41	48
60-66	--	59.45	46.66	37.11	32.61	28.64	1.85	10	41	49
66-72	--	60.60	49.07	35.29	30.08	26.23	<u>2.06</u>	13	41	46
Total.....							15.72			

Sample 11a

Soil Type: Wickham loamy sand
 Classification: Gray-brown podzolic
 Area: Barrow County, Georgia

Parent Material: Alluvium
 Drainage: Well

Depth (in.)	Bulk density	Percent water by volume					Available water	Textural analysis		
		1/3 atm	2 atm	4 atm	8 atm	15 atm		Sand	Silt	Clay
							<u>In.</u>	<u>Pct.</u>	<u>Pct.</u>	<u>Pct.</u>
0-6	1.67	9.37	6.45	5.29	4.41	4.07	0.32	82	8	10
6-12	1.60	14.26	10.96	9.89	8.53	7.97	.38	73	8	19
12-18	1.53	14.40	10.79	9.84	9.59	9.00	.32	68	7	25
18-24	1.54	15.31	11.27	10.66	9.83	9.35	.36	68	7	25
24-30	1.56	17.83	12.75	11.75	11.00	9.95	.47	66	10	24
30-36		17.92	13.48	11.65	11.20	10.14	.47	67	9	24
36-42	1.63	19.59	14.46	13.50	12.13	10.14	.57	67	8	25
42-48		23.80	16.71	14.78	14.36	10.14	.85	67	8	25
48-54	--	32.31	21.56	18.61	17.86	10.94	1.28	61	13	26
54-60	--	38.34	24.68	21.27	19.84	13.22	1.51	54	18	28
60-66	--	45.00	29.07	24.01	21.83	18.64	1.58	42	28	30
66-72	--	35.71	24.48	21.47	17.96	15.79	<u>1.20</u>	47	23	30
Total.....							9.31			

Sample 11b

Soil Type: Wickham sandy clay
 Classification: Gray-brown podzolic
 Area: Elbert County, Georgia

Parent Material: Alluvium
 Drainage: Well

Depth (in.)	Bulk density	Percent water by volume					Available water	Textural analysis		
		1/3 atm	2 atm	4 atm	8 atm	15 atm		Sand	Silt	Clay
							<u>In.</u>	<u>Pct.</u>	<u>Pct.</u>	<u>Pct.</u>
0-6	1.69	25.55	21.34	19.49	18.35	17.00	0.51	46	16	38
6-12	1.60	32.56	29.09	27.12	26.00	24.32	.49	31	16	53
12-18	1.56	34.09	29.16	27.55	26.43	25.07	.54	32	14	54
18-24	1.67	35.80	31.06	29.17	28.14	26.85	.54	31	14	55
24-30	1.59	36.40	31.85	29.88	28.49	27.83	.51	31	13	56
30-36		36.40	31.05	29.89	29.67	28.11	.50	30	11	59
36-42	1.65	36.51	31.73	29.96	29.57	28.22	.50	34	10	56
42-48		36.09	31.35	30.46	29.72	28.36	.46	33	9	58
48-54	--	34.17	30.10	29.04	28.30	27.27	.41	34	10	56
54-60	--	33.66	29.42	26.98	27.19	25.99	.46	38	9	53
60-66	--	31.58	26.75	25.10	22.67	25.53	.36	39	9	52
66-72	--	30.69	27.51	26.19	25.38	24.88	<u>.35</u>	39	11	50
Total.....							5.63			

Sample 11c

Soil Type: Wickham sandy clay loam
 Classification: Gray-brown podzolic
 Area: Clarke County, Georgia

Parent Material: Alluvium
 Drainage: Well

Depth (in.)	Bulk density	Percent water by volume					Available water	Textural analysis		
		1/3 atm	2 atm	4 atm	8 atm	15 atm		Sand	Silt	Clay
							<u>In.</u>	<u>Pct.</u>	<u>Pct.</u>	<u>Pct.</u>
0-6	1.65	25.62	18.48	16.68	15.71	14.59	0.66	56	14	30
6-12	1.62	24.28	18.87	16.69	15.70	14.82	.57	50	15	35
12-18	1.55	31.03	26.44	24.06	22.83	22.15	.53	43	14	43
18-24	1.55	39.65	35.05	31.82	30.89	29.28	.62	35	13	52
24-30	1.60	40.08	35.55	31.86	31.76	29.76	.62	42	9	49
30-36		36.42	32.67	30.27	28.96	27.10	.56	47	9	44
36-42	1.58	31.60	27.52	25.88	24.95	23.54	.48	57	6	37
42-48		27.68	24.06	22.21	21.61	20.95	.40	65	5	30
48-54	--	31.22	27.16	25.25	25.00	24.30	.42	57	6	37
54-60	--	33.81	28.82	27.41	26.15	25.14	.52	57	7	36
60-66	--	33.04	28.22	26.73	25.52	24.36	.52	58	7	35
66-72	--	26.01	22.34	21.60	20.68	18.93	<u>.42</u>	63	7	30
Total.....							6.32			

Sample 11d

Soil Type: Wickham clay
 Classification: Gray-brown podzolic
 Area: Lincoln County, Georgia

Parent Material: Alluvium
 Drainage: Well

Depth (in.)	Bulk density	Percent water by volume					Available water	Textural analysis		
		1/3 atm	2 atm	4 atm	8 atm	15 atm		Sand	Silt	Clay
							<u>In.</u>	<u>Pct.</u>	<u>Pct.</u>	<u>Pct.</u>
0-6	1.68	30.32	25.27	22.60	20.82	19.99	0.62	35	19	46
6-12	1.59	29.32	25.60	23.83	22.12	21.10	.49	38	16	46
12-18	1.59	30.18	27.38	25.28	22.83	22.80	.44	34	16	50
18-24	1.68	35.97	31.60	29.03	27.72	26.61	.56	30	18	52
24-30	1.70	36.53	31.93	29.60	27.64	26.55	.60	29	19	52
30-36		36.50	32.03	27.86	27.76	26.86	.58	31	19	50
36-42	1.67	34.02	29.64	27.37	26.22	24.67	.56	38	14	48
42-48		38.56	33.75	31.06	29.86	28.49	.60	32	13	55
48-54	--	44.67	37.88	35.65	34.25	32.46	.73	28	13	59
54-60	--	43.20	37.69	35.70	34.02	33.08	.61	31	13	56
60-66	--	42.47	35.44	32.67	30.81	29.38	.79	28	20	52
66-72	--	35.00	28.26	25.02	22.70	21.28	<u>.82</u>	39	21	40
Total.....							7.40			

SOIL PROFILE DESCRIPTIONS

Following are soil profile descriptions for 14 of the sites included in this study.

<u>Soil Profile</u> (Appling sandy clay loam, very gently sloping. Sample 1b*):		
A _p	0"-8"	Brown (10YR 5/3) loose sandy clay loam; weak, fine, granular structure; boundary abrupt and smooth; slightly acid.
A ₂	8"-14"	Light yellowish-brown (10YR 6/4) very friable sandy loam; weak, fine, granular structure; boundary gradual and wavy; slightly acid.
B ₂	14"-20"	Light olive brown (2.5Y 5/6) friable sandy clay loam; few, fine, and faint mottles of reddish yellow (5YR 6/8); weak, medium subangular blocky structure; boundary gradual and wavy; slightly acid.
B ₃	20"-56"	Dark red (10R 3/6) firm sandy clay loam with common, coarse, prominent mottles of yellowish brown (10YR 5/4) and few, faint and distinct mottles of brownish yellow (10YR 6/8); moderate medium blocky structure; boundary gradual and irregular; strongly acid.
C	56" +	Red (2.5YR 4/8) sandy loam; weathered, disintegrated granite and quartz rocks.

<u>Soil Profile</u> (Cecil sandy clay loam, very gently sloping. Sample 2b):		
A _p	0"-6"	Strong brown (7.5YR 5/6) loamy coarse sand; weak, medium subangular blocky structure; friable to loose; strongly acid; boundary gradual and smooth; 4 to 8 inches thick; rapid permeability; low organic content; numerous roots.
A ₂	6"-10"	Strong brown (7.5YR 5/6) loamy coarse sand; very friable; weak, medium subangular blocky structure; strongly acid; boundary gradual and wavy; low organic content; rapid permeability; contains some gravel; 3 to 5 inches thick.
A ₃	10"-13"	Red (2.5YR 4/8) sandy loam with moderate medium subangular blocky structure; friable; strongly acid; boundary clear and smooth, moderate permeability, low organic content; 2 to 4 inches thick.
B ₁	13"-16"	Red (2.5YR 5/6) sandy clay loam with moderate medium subangular blocky structure; friable; strongly acid; boundary coarse and smooth; 2 to 10 inches thick; moderate permeability; numerous roots; low organic content.
B ₂	16"-34"	Red (10R 4/6) clay loam with strong medium subangular blocky structure; firm; very strongly acid; boundary diffuse and smooth; moderate permeability; 18 to 44 inches thick; few roots.
B ₃	34"-42"	Dark red (10R 3/6) clay with strong medium subangular blocky structure; firm; very strongly acid; boundary, abrupt wavy; moderately permeable; some mica present; 6 to 10 inches thick.
C	42"-66+	Dusky red to red (10R 3/4 - 2.5R 5/8) massive friable loam parent material; strongly acid; some mica; disintegrated clay may be present.

*Locations of samplings are denoted by sample numbers on figure 1.

Soil Profile (Cecil sandy loam, eroded, very gently sloping. Sample 2c):

A _p	0"-8"	Dark brown (7.5YR 4/4) sandy loam; weak, fine, granular structure; very friable; strongly acid; abrupt smooth boundary.
B ₁	8"-12"	Reddish-brown (5YR 4/4) sandy clay loam; moderate fine subangular blocky structure; friable; strongly acid; clear and wavy boundary.
B ₂	12"-28"	Red (2.5YR 4/6) sandy clay loam; moderate fine and medium subangular blocky structure; clay skins on ped surface; firm; strongly acid; gradual and wavy structure.
B ₃	28"-44"	Red (2.5YR 5/6) clay loam; moderate medium subangular blocky structure; friable; strongly acid; gradual and wavy structure.
C	44"+	Slightly mottled-red (2.5YR 5/6) with common, medium, distinct reddish-yellow (5YR 6/8) sandy clay loam; very friable disintegrated parent material.

Soil Profile (Davidson clay. Sample 4b):

A _p	0"-5"	Reddish-brown (2.5YR 5/4) soft, very friable loam; weak, fine crumb structure; slightly acid; boundary clear and wavy; 2 to 6 inches thick.
A ₃	5"-10"	Dark reddish-brown (2.5YR 3/4) soft, friable loam; with moderate medium subangular blocky structure; medium acid; boundary gradual and wavy; 4 to 8 inches thick.
B ₂	10"-48"	Dusky red (10R 3/4) firm clay; moderate medium subangular blocky structure; boundary gradual and wavy; medium acid; 32 to 48 inches thick.
B ₃	48"-86"	Dusky red (10R 3/2) firm sticky clay; moderate fine subangular blocky structure; boundary gradual and wavy; strongly acid; 20 to 30 inches thick.
C	86"+	Weathered basic rocks with red (2.5YR 4/8) friable sticky, silty clay.

Soil Profile (Davidson clay loam, eroded, very gently sloping. Sample 4c):**

A _p	0"-10"	Dark reddish-brown (5YR 3/4) slightly hard loam; weak fine granular structure; strongly acid; boundary clear and wavy.
A ₃	10"-15"	Dark reddish-brown (2.5YR 3/4) very hard clay loam; moderate medium granular structure; strongly acid; boundary gradual and wavy.
B ₂	15"-75"	Dusky red (10R 3/4) hard clay loam; moderate medium blocky structure; strongly acid; boundary gradual and wavy.
C	75"+	Red (10R 4/6) very hard clay loam; moderate medium blocky structure; strongly acid.

**This profile written under dry conditions.

Soil Profile (Georgeville clay, very gently sloping. Sample 6a):

A ₁	0"-6"	Yellowish-brown (10YR 5/4) very fine sandy loam; weak, very fine granular structure; friable when moist; strongly acid; abrupt and smooth boundary.
A ₂	6"-10"	Brownish-yellow (10YR 6/6) very fine sandy loam; weak, very fine granular structure; friable when moist; strongly acid; abrupt and smooth boundary.
B ₁	10"-12"	Yellowish-red (5YR 5/8) silty clay loam; moderate fine angular blocky structure; friable when moist; strongly acid; clear and wavy boundary.
B ₂	12"-30"	Red (2.5YR 4/6) clay loam; moderate coarse subangular blocky structure; firm when moist; strongly acid; gradual and wavy boundary.
B ₃	30"-40"	Red (2.5YR 5/8) clay loam with few, fine, distinct mottles of yellowish brown (10YR 5/8); moderate coarse subangular blocky structure; firm when moist; strongly acid; gradual and wavy boundary.
C	40"-55"	Red (2.5YR 5/8) clay loam with common, medium distinct mottles of yellow (10YR 7/8); moderate very coarse subangular blocky structure; very firm when moist; strongly acid.

Soil Profile (Helena loamy sand, very gently sloping. Sample 7a):

A _p	0"-4"	Gray-brown (2.5Y 5/2) sandy loam; weak fine granular structure; very friable when moist; very strongly acid; abrupt and wavy boundary.
A ₂	4"-10"	Light yellowish-brown (2.5Y 6/4) sandy loam; weak medium and fine granular structure; very friable when moist; very strongly acid; clear and wavy boundary.
A ₃	10"-12"	Olive-yellow (2.5Y 6/6) sandy loam; weak medium subangular blocky structure; friable when moist; very strongly acid; clear and wavy boundary.
B ₁	12"-15"	Yellowish-brown (10YR 5/6) sandy clay loam; moderate medium subangular blocky structure; firm when moist; very strongly acid; abrupt and wavy boundary.
B ₂	15"-35"	Light gray (2.5Y 7/2) clay with few medium faint mottles of reddish brown (5YR 4/4); strong medium subangular blocky structure; very firm when moist; very strongly acid; diffuse and wavy boundary.
C ₁	35"-52"	Light gray (2.5Y 7/2) clay with many medium distinct mottles of dusky red (10R 3/4); strong medium subangular blocky structure; firm when moist; very strongly acid; diffuse and wavy boundary.
C ₂	52"-70"	Highly weathered friable, silty clay.

<u>Soil Profile</u> (Iredell sandy clay loam, eroded, very gently sloping. Sample 8a):		
A _p	0"-6"	Dark gray (5Y 4/1) fine sandy loam; weak, fine, granular structure; very friable when moist; boundary gradual and wavy; very strongly acid.
B ₂	6"-17"	Light olive-brown (2.5Y 5/4) clay; strong, very coarse blocky structure; very firm when moist; boundary gradual and wavy; very strongly acid.
B ₃	17"-22"	Light olive-brown (2.5Y 5/6) clay mottled with common medium distinct mottles of olive (5Y 4/4); strong coarse blocky structure; boundary gradual and irregular; very strongly acid.
C	22" +	Highly weathered decomposed basic parent material mingled with black, olive, and yellow splotches; very strongly acid.

<u>Soil Profile</u> (Lloyd sandy clay loam, eroded, very gently sloping. Sample 9b):		
A _p	0"-4"	Reddish-brown (5YR 4/4) loose loam; weak, fine, granular structure; medium acid; boundary clear and smooth.
A ₃	4"-8"	Dark red (2.5YR 3/6) friable loam; moderate medium granular structure; medium acid; boundary gradual and wavy.
B ₂	8"-62"	Dark red (2.5YR 3/6) very firm clay loam; moderate medium subangular blocky; medium acid; boundary gradual and wavy; few quartz fragments occur in this horizon.
C	62" +	Dark red (2.5YR 3/6) very friable clay; with few faint, fine mottles of red (2.5YR 4/8); moderate medium subangular blocky; medium acid.

<u>Soil Profile</u> (Lloyd sandy loam, eroded, very gently sloping. Sample 9c):		
A _p	0"-7"	Dark reddish-brown (2.5YR 3/4) sandy loam; weak, fine, granular structure; friable when moist; boundary clear and wavy; very strongly acid.
A ₃	7"-10"	Dark reddish-brown (2.5YR 3/4) heavy sandy loam; moderate medium granular structure; friable when moist; boundary gradual and wavy; very strongly acid.
B ₁	10"-18"	Dark red (2.5YR 3/6) silty clay loam; moderate medium subangular blocky structure; friable when moist; boundary gradual and wavy; very strongly acid.
B ₂	18"-33"	Red (2.5YR 4/6) clay loam; moderate medium angular blocky structure; firm when moist; boundary gradual and wavy; very strongly acid.
B ₃	33"-39"	Red (2.5YR 4/6) silty clay mottled with few, fine distinct mottles of strong brown (7.5YR 5/8); moderate medium angular blocky structure; friable when moist; boundary gradual and wavy; very strongly acid.

C 39"-60"+ Red (2.5YR 5/8) silty clay mottled with many medium distinct mottles of strong brown (7.5YR 5/6); massive structure; friable when moist; very strongly acid.

Soil Profile (Lloyd clay loam. Sample 9d):

A_p 0"-4" Reddish-brown (5YR 4/3) sandy loam with weak, coarse, and medium subangular blocky structure; friable; medium acid; boundary clear and wavy; 3 to 6 inches thick; abundant roots; moderately rapid permeability; low organic content.

B₂ 4"-20" Dark red (10R 3/6) clay loam; weak, medium, and fine subangular blocky structure; friable; hard when dry; plastic when moist; medium to strongly acid; boundary gradual and wavy; 10 to 20 inches thick; numerous roots; moderate permeability.

B₃ 20"-44" Dark red (2.5YR 3/6) clay with medium, fine angular blocky structure; firm; strongly acid; boundary diffuse and wavy; 20 to 50 inches thick; few roots; moderately slow permeability.

C 44"-56"+ Dark red (10R 3/6) decomposed and disintegrated rock with vari-colored red fragments that crush to a very friable loam with moderate hand pressure; strongly acid; thickness varies over hard rock; no roots observed.

Soil Profile (Wickham sandy clay. Sample 11b):

A_p 0"-9" Dark red (10R 3/6) friable sandy loam; weak crumb structure; moderately acid reaction; boundary clear and smooth; 6 to 12 inches thick.

B₁ 9"-19" Dusky red (10R 3/4) friable sandy clay loam; moderate fine crumb structure; acid reaction; boundary clear and wavy; 8 to 12 inches thick.

B₂ 19"-33" Dark red (2.5YR 3/6) friable sandy clay loam; moderate fine crumb structure; acid reaction; clear and wavy boundary; 10 to 22 inches thick.

B₃ 33"-45" Dark red (2.5YR 3/6) friable sandy clay loam; moderate fine crumb structure; acid reaction; boundary gradual and wavy; 10 to 24 inches thick.

C 45" + Dark red (2.5YR 3/6) friable sandy clay loam with common medium, distinct yellowish-brown (10YR 5/4) mottles of friable sandy clay loam; moderate, fine crumb structure with gradual wavy boundary; acid reaction; very few, fine (5-10mm) water-rounded gravel in this horizon; no mica flakes are present.

Soil Profile (Wickham sandy clay loam. Sample 11c):

A_p 0"-6" Dark reddish-brown (5YR 3/4) fine sandy loam with very weak coarse and medium subangular blocky structure; very friable; strongly acid; boundary clear and wavy; 4 to 10 inches deep; abundant roots; moderately rapid permeability; low in organic content.

B ₁	6"-11"	Dark red (2.5YR 3/6) sandy clay loam with moderate coarse, medium, and fine subangular blocky structure; friable; strongly acid; boundary gradual and wavy; 4 to 7 inches thick; many roots; moderately rapid permeability.
B ₂	11"-70"	Dark red (10R 3/6) clay loam with moderate fine and medium angular blocky structure; firm; strongly acid; boundary gradual and wavy; 20 to 70 inches thick; few roots; moderately slow permeability.
B ₃	70"-77"+	Dark red (10R 3/4) clay loam with moderate coarse and medium angular blocky structure; firm; strongly acid; boundary gradual and wavy; 7 to 25 inches thick; moderately slow permeability; contains numerous small quartzite gravels and much mica.

Soil Profile

(Wickham clay, eroded, very gently sloping. Sample 11d):

A _p	0"-9"	Dark red (10R 3/6) fine sandy loam; weak, fine crumb structure; very friable when moist; medium acid; clear and smooth boundary.
B ₁	9"-19"	Dusky red (10R 3/4) sandy clay loam; moderate fine crumb structure; friable when moist; strongly acid; clear and wavy boundary.
B ₂	19"-33"	Dark red (2.5YR 3/6) sandy clay loam; moderate fine crumb structure; friable when moist; medium acid; clear and wavy boundary.
B ₃	33"-45"	Red (2.5YR 4/6) sandy clay loam; moderate fine crumb structure; friable when moist; strongly acid; gradual and wavy boundary.
C	45"+	Dark red (2.5YR 3/6) sandy clay loam mottled with common, medium, distinct mottles of yellowish brown (10YR 5/4); moderate fine crumb structure; strongly acid.

